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FAMILY LYCEUM.

JOSIAH HOLBROOK, Editor.

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COMMON THINGS.

ACIDS.

One acid is more common than any other. It is even one of the most common things in the world. It is found in the atmosphere at all times, and in all places.

Being nearly twice as heavy as common air, it settles in low places, such as wells, caves, &c. It is also combined with some rocks, especially limestone, and many minerals.

This most common of acids is constantly forming by several processes of nature, and in great abundance. Indeed the whole animal kingdom are constantly producing it in the process of respiration. It is also formed wherever combustion is going on, such as the burning of the common fire, lamps, candles, &c.

Fermentation also produces it, and sometimes in great abundance. Whenever bread, yeast, wine, beer, cider, molasses or any substance undergoes the lenst fermentation, the result is an acid in the form of air, which is as extensive and common as the atmospheric air.

It is this acid that gives the life and sparkling to bottled cider, beer, soda water, and many other liquids used as beverages. It is the loss of this acid that renders beer, cider, wine, &c. dead, as it is termed.

Though this acid of which we are speaking is healthful and invigorating when taken into the stomach, it has many times proved fatal to life, when taken into the lungs. Persons descending into wells or other low places, where it has taken possession, have frequently dropt lifeless. In some instances persons have instantly lost their lives, by descending into a fermenting vat in a brewery, or distillery, after being emptied of the substance fermented, the acid produced in the fermentation still keeping possession and filling the vat. The burning of coal in a pan, or a common portable furnace confined in a tight room, has frequently produced so much of this acid as to destroy life. It is alwasy produced in such quantities in the burning of coal, as to be hurtful, if not dangerous, to be confined in a room where it is burning, unless the room has a chimney or some other ventilation to displace the bad air, and supply the good.

The manufacturers of soda water form this acid by pouring oil of vitirol upon pulverized marble, which is discharged from the lime or marble in the form of bubbles, which chemists call effervescing. They then combine it with water, in which soda has been dissolved, by a forcing pump. The pressure thus created by it is frequently so great as to burst casks strongly hooped and barred.

Though this is the most common, it is the weakest among the acids; and hence when vinegar, oil of vitriol, (sulphuric acid,) or al most any other acid, is poured upon lime, pearlash, or saleratus, ashes, and many other substances containing this, it produces an effervescence, by which it is discharged, and gives place to the other and stronger acid.

This very common thing, of which we are speaking, is composed of oxigen, which signifies *acid maker*, and carbon, which gives it the name of *carbonic acid.*

Vinegar, next to carbonic acid, is the most common among the numerous acids, and can be formed from any substance capable of being fermented. Wine, cider, molasses, the juice of the sugar cane, and the sap of the maple and of some other trees, are used for forming this useful article in domestic economy. Fermentation produces spirit, or alcohol, before it forms the acid; and vinegar is always, or nearly always, produced by the destruction of alcohol. Just before cider becomes vinegar it is worth most to the distiller; but after that, it is useless to him, but much more useful to society, as it then does not deprive men of their senses and make them lower than the brutes, but is highly useful in the family and many of the arts.

When vinegar is combined with lead, it forms sugar of lead, more properly acetate of lead. With copper it forms virdigris, or acetate of copper, much used for paints. It has other combinations which are useful.

A very useful acid resembling vinegar is formed from the distillation of wood. One hundred pounds of seasoned maple, beach, or other hard wood, will produce thirty three pounds of a liquid substance, very useful in the arts, especialy in the manufactory of white lead, for which and some other purposes it takes the place of vinegar. It is a powerful preservative of animal matter, and has been much used as a substitute for smoke in preserving hams and other meat. The bodies of persons dying at a distance from home have frequently been preserved in it while they were returned to their friends. It is useful for numerous purposes, and is called *pyroligneous acid.*

If sulphur be burned, when mixed with salt petre, it produces a common and useful acid. If burnt in pure oxigen, it forms the same acid. It is frequently called oil of vitriol, but more properly *sulphuric acid.* Its uses are very numerous and very important, but they cannot be specified now. This with other acids will be more particularly described hereafter.

ALKALIES.

Potash, soda and amonia are called alkalies. The two first are used in one form or another every day in every family in civilized society. The last is much more extensively used in agriculture and the arts than is generally supposed. Potash and soda are both used for making soap: the one for soft, the other for hard soap. We are, of course, indebted to them in no small degree for the means of cleanliness, which are essential to comfort and decency, and in days of cholera to health and safety.

Potash is a part of salt petre, also of other salts, and of many rocks, and other minerals. Soda constitutes a part of table salt, and a large part of some other substances.

Amonia is commonly, if not always produced, where there is fermentation and decay of animal matter, and is perhaps one of the most efficient aids to farmers in giving them abundant crops.

Lime and magnesia have some of the properties of alkalies, and are hence called alkaline earths.

The principal object in introducing the acids and alkalies at this time, is to show their relation to each other, which is intimate and intimately connected with our daily comfort and even our extstence. The most prominent and interesting point in this relation is, their strong attraction for each other. In nature they are almost always united. It is even difficult to separate them. Indeed the most direct, if not the only way, in which an alkali can be induced to give up the acid with which it is associated, is, to present it with another which it likes better. The potash in saltpetre will discharge the nitric acid, which has been its associate perhaps for centuries, if it can have the society of sulphuric acid, for which it uniformly has a stronger partiality. Sulphuric acid will also induce the soda, in common table salt, to discharge the muriatic acid which has been its most intimate, and almost only friend from their youth, even for five or six thousand years, on condition of the society of the new comer. Pearlash will immediately discharge the carbonic acid which it has taken into compact, when madam vinegar presnts her self, though not without some struggles and commotions, between the three, which chemists call effervescence; and it would be well for society, perhaps, if effervescence between old friends and associates, was confined to acids and alkalies.

Acids and alkalies, when alone, are corrosive, and disposed to attack many things coming in their way; but when united, they are both so far softened in their character, and appeased in their wrath, as to be harmless and exceedingly kind and serviceable.

For example, potash and nitric acid, which compose salt petre, and soda and sulphuric acid, which compose ghuber salts, when pure and alone, are some of the most biting, corrosive things in the world; when united, both are mild and comparatively harmless, and for many purposes highly important. This softening down of the character of acids, alkalies, and many other substances, by uniting them, is what chemists call *neutralising.* If the asperities of living, acting, talking things, could be more frequently neutralized, by some kind friends, it would be for their own peace and credit, and for the quiet and happiness of those around them.

Acids and alkalies, being in daily and almost constant use in every family, it could hardly fail of being a source of great interest, as well as practical utility, to have their properties and relations as familiar as the names of the common household furniture. It is not uncommon for accidents to occur, and sometimes life is destroyed, or a wretched existence prolonged by a mistake, in using an acid or alkali for some other substance. Three fourths of the evil arising from these mistakes might be prevented by a knowledge of the remedy which is almost always at hand; a knowledge, too, which can be acquired in a few hours, or a few days at most.

For example, if a person, by accident, drink a solution of potash, pearlash, or common ley, a knowledge that it was an alkali and of course neutralized by an acid, would direct him or a friend to the vinegar cruit. If an acid was taken, he would go directly to the pearlash bottle, or throw some ashes into water and make some quick ley which he would drink.

If an acid or an alkali is spilt upon a garnent and in danger of producing a stain or destroying its texture, if the other be applied, the evil in nine cases out of ten, will be prevented.

More of these two classes of bodies, with their relations and uses in the domestic and useful arts, in the future numbers.

Juvenile Philosophy.

The simplicity, the sprightliness, the animation, the affection, the kindness, the activity, the ease and grace of motion, the simmetry and beauty of form, curiosity, the love of knowledge, the accute discrimination, and especially, the candor and freedom from deceit or dissimulation, in a child, render it scarcely a less interesting object to the philosopher, than the mother. The beautiful plants and flowers which bedeck the garden or the wayside; the rich fields of corn and wheat, which, under the cultivation of the farmer's hand, wave in the breeze; the lofty forest tree, which boldly faces the tempest, and endures the buffeting of a thousand winters; the myriads of insects, which swarm in the air; the innumerable fishes which sport in the sea; the numerous birds, which, with a thousand beautiful hues, and graceful motions, wave through the air; the powerful quadrupeds, which move through the field or roam over the earth, either in kindness or rage; the beautiful crystal, which bespangles the mountain top, or glitters in the sun beam; the towering mountain, which breaks the clouds, and checks the tempest; the beautiful stream which meanders through the plain and clothes it with a rich garment of green; the boundless ocean, which heaves its waves into mountains, and buffets the mountain's bold front; the moon, with its calm but cheering light; the sun, with all its glory as it proclaims the day and enlightens, warms and regulates other worlds; the stars, with the vast and innumerable systems which they animate and govern; nor system piled on system through space where the immagination cannot reach; nor all the material but irrational objects of the vast creation of God, of themselves combined; present a subject so great, or so interesting to the christian, the philantropist or the philosopher, as the *little child*, returning the smile, inviting the embrace and reciprocating the affection of its mother.

Without an intellectual and moral universe, the whole creation beside could be little more than an august play thing, aiming at no object, communicating no happiness, producing no results, and answering no purpose. But the mind and heart of the little child takes hold on eternity; the mind is connected with the whole material creation; it can roam through all space; it can infuse itself into every other mind in a nation or a world.

In many points, and those of the highest importance in a moral creation, the child is evidently superior to the man. In simplicity, honesty, and curiosity, always; in sprightliness, love of knowledge, kindness, strength of affection, power of moral discrimination, generally. In the last, or the power, the niceness and the accuracy of discrimination on moral subjects—judging in a simple question of right and wrong—children have infinitely the advantage of adults They look at things, at actions, through a clear atmosphere, with their eyes unobstructed by beams or motes; while adults look through an atmosphere of mist, of fog, of dust, their eyes too often wholly closed with prejudice, with passion, with deep-rooted selfishuess, with strong bias, with popular sentiment, with ambition, with lust, with all the unamiable, violent and ungodly passions which have provoked, strengthed and enraged each other through a course of twenty, fifty or eighty years.

Cases are not wanting, they are at all times thick before us and around us, of deformity of moral vision, and with it an obtuseness of intellect, which practices and justifies the most abominable deeds of ungodliness and iniquity. Look at the manufacturer or the seller of rum, and examine his moral perceptions, and compare them with those of the child four years old. See him, scattering poison, misery, and death, among his neighbors, robbing his neighbor's wife of her bread, her peace, her husband, her children, her life—a public murderer, and still professing to love his neighbor as himself.

By whom is the traffic in human flesh or human blood, carried on? who builds and navigates the slave ship or the war ship; by whom and for whom, are annually expended in our christian nation, eight millions of dollars, to prepare to turn our nation, at some future time, into one great slaughter house—to establish the profession, and to pursue the business, of public and of human butchery? Whose breasts rage with war; whose conscience justifies war; the unoffended, unoffending and unadultered child, or the half educated, and the wholly spoilt man?

Who cannot see, that, until the moral perceptions, and moral powers of children, are better understood, more duly appreciated, more carefully preserved and cultivated, the world cannot be reformed, the fallen race of men cannot be restored, the milleneum cannot arrive? Who must not believe that when the physical, the intellectual, the social, the moral and the immortal powers of children, combine their influence and their efforts to cultivate the heart, to perceive more clearly, and to discriminate more exactly the relations, and to feel more strongly the power of love to God and love to our neighbor, the world will be reclaimed, that man will be restored, that the milleneum will arrive, that ignorance and vice, with their long and thick train of miseries, will take their final departure from our earth?

English Alphabet.

Our alphabet is bad at best, and much worse than is necessary. In learning it to children, two great mistakes are generally committed. Children ought to learn the small letters before the capitals, and words before either. A child will learn the word cow, ten times, while he will learn the letter c once. The reason is plain; cow means something or expresses an idea; c means nothing and of course carries no idea to the mind of the child. The mind is made for ideas, and when they are presented to it, in a way that it can comprehend them, it immediately takes hold of them.

The large or capital letters ought never to be presented to the mind of a child, until all the small ones are learned. The reason of this is, that in books as they are com-

monly printed, there are about one hundred, and in some instances, four or five hundred small letters to one capital. Consequently, if they learn the small letters, they will be able to spell the words, and will learn the capitals of course.

It cannot be doubted that by these two mistakes, many thousand years of the precious time of children have been wasted, and worse than wasted. For while they ought to have been learning, and made happy by it, they have learnt little or nothing, and most that they have gained is a strong dislike to books, to their school, and to every thing connected with learning.

If any parent or teacher doubts the correctness of this statement, let him try the experiment, and he will be convinced.

Science.

Mr. Editor—In this age of improvement, and diffusion of knowledge, every one must have often heard the terms Science, Natural Science, Natural History, Mathematical Science, the Exact Sciences, Physical Science, Chemical Science, Natural Philosophy, Intellectual and Moral Philosophy or Science, besides numerous other terms, more specific and perhaps more definite in their signification. I should like to know if these various terms have definite lines of demarkation; and if so, what they are. I should like to know what is meant by the word science, in its most extensive meaning; whether Grammar is properly called a science; if so, whether it has its foundation in nature or in the opinion or common consent of men; what is the appropriate definition of Natural Science, and whether the Mathematics are embraced under that term; also, Natural History; and whether Anatomy, Geology and Geography are branches of Natural History? I should like to know more definitely than I do at present, what is meant by Natural Philosophy, and under what more general branch of science Astronomy is classed.

I suppose a person may know something about Natural History, if he is not satisfied whether it extends to the description of all natural objects, or whether it is confined to a description of organized bodies, or animals and plants; and if thus confined, whether it embraces the anatomy or any part of the Physiology of those bodies, or extends only to their external character.

Although I am aware, that a knowledge of the definite lines of division between the several sciences, is not essential to a knowledge of those sciences, yet if yourself or any of your correspondents will give in your columns an exact definition of some of those terms, or what they are generally considered to mean, you will oblige one of your readers at least. A TYRO.

GEOLOGY.

QUARTZ.

The varieties of quartz constitute the most numerous family in the mineral kingdom. The most common kind of quartz, are the white pebbles which meet the eye almost every where, especially in New England and all the Atlantic States, on the shore, and the banks of rivers, in the field and by the way side. The same not unfrequently occurs in masses from the size of a quart to a half bushel measure. Gun flint is a species of quartz, differing from most other kinds, by its peculiar fracture, which is called conchoidal, or resembling a shell, which fits it for the principal use to which it is applied. It is a singular fact that most of the flint is found imbedded in chalk, in the south of England and the north of France. Perhaps no two minerals are more unlike.

Taking names from their color, are milk quartz, rose quartz, violet quartz, or amethyst, yellow quartz, smoky quartz, irised quartz, having a play of brilliant colors, brown quartz and green quartz, or prase.

There is also crystalized quartz, sometimes limpid or transparent, and sometimes opaque; usually occurring in six-sided crystals, ending in six-sided pyramids. They are known all over the country by the name of diamonds, probably from their hardness, as they scarcely resemble the diamond otherwise. The limpid quartz is sometimes found so perfectly transparent, as to be preferable to glass for spectacles.

Jasper, calcedony, agates, carnelian, opal, and some other precious stones, belong to this family of minerals.

More than 90 per cent. of nearly every variety of quartz is silex, which was observed in the last number, to consist of oxygen and silicum, and more extensively diffused through the mineral kingdom than any other substance.

Quartz forms a component part of more rocks, and enters more largely into soils, than either of the eight simple mineral which will be named and described in future numbers of the Lyceum. Granite gneiss, mica slate, sienite, sandstone, soap stone, and chlorite slate, which together constitute more than nine tenths of the rock in New England and east of the Alleghany mountains, all contain quartz, and most of them in large proportions.

Sandbanks are almost entirely quartz in pulverized state. All soils, even those which are called clay soils, contain a large proportion of quartz.

Glass of every description, from the coarsest to the finest, is made of quartz, with little of any thing else, except some alkali, to render it more fusible, or easily melted, and some metal to give it color.

Smoky quartz, limpid quartz, Jaspr, amethyst, carnelian, calcedony, agate, and some other varieties are cut for ornament.

Notwithstanding this substance is so exceedingly common, less than thirty years ago, there was hardly a person in the United States who knew its name. A Professor who has since distinguished himself as a mineralogist, observed that within that time, he neither knew the mineral, nor of any one in the country who could inform him what quartz was. Another learned Professor, whose works on mineralogy have since been translated into the German and French languages, remarked, that twenty-five years ago he did not know that there was but one kind of rock in the world, and he did not know the name of that. Now, thousands of children in the country, under six years of age, are as familiar with quartz, and the most common rocks, with many of their uses, as they are with knife, hat or chair.

THE ARTS.

BREAD.

In the previous number it was remarked that the whole vegetable kingdom was composed of three simple elementary substances, viz. oxygen, hydrogen and carbon. Of these three starch is composed. And starch constitutes a large part of most grains, and many roots. Into some of the grains, especially wheat, and in less quantities rye, another substance, entirely unlike starch, enters. This is called gluten, which is also composed of oxygen, hydrogen and carbon.

The starch and gluten composing wheat can be easily separated, either in the grain or flour. The starch is soluble in water and the gluten is not: consequently, if kernels of wheat be retained in the mouth for a short time, the starch will be dissolved and removed, leaving behind the gluten. Or, if a gill of wheat flour be put into a cup, and exposed to repeated washings, pouring off the water after it is applied, it will gradually dissolve, and carry off the starch from the flour, leaving the gluten by itself. The gluten is unlike starch in being insoluble in water, but it is tenacious and elastic, resembling India rubber.

To the gluten we are entirely indebted for light bread. The flour of Indian corn, rice, potatoes, and many other vegetables, though they may be used for bread, can never be raised so as to make light bread. In the process of fermentation in bread carbonic acid is formed, which is retained only by the gluten, the starch permitting it to escape as fast as made.

The art of making bread, especially light bread, then, depends much upon diffusing the yeast through it equally, in other words, thoroughly kneading it. When that is done, the carbonic acid is generated in nearly equal quantities through the whole mass, the gluten retaining it so as to render the bread uniformly light.

When the yeast is diffused unequally through the mass, some portions of the dough are raised before others, leaving parts of it unraised, or *heavy*, while other parts are carried so far perhaps as to become sour.

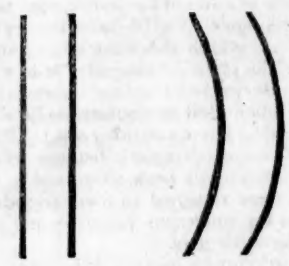
The success of making bread, depends, perhaps, so much upon no one thing, as properly regulating the fermentation. And the agent which carries on the fermentation in bread, as it does in cider, beer, wine, &c. is oxygen. Having regard to this simple, elementary, but highly active substance, as it exists in the atmosphere and in the vegetable kingdom, will aid a person in regulating fermentation, whenever he is called to do it. And there is probably no cause to which we can so reasonably attribute the cholera, and all other diseases arising from a putrid state of the atmosphere, as fermentation. For although fermentation goes through four different stages, it always ends, if continued, in putrifaction. In the last stage of this very extensive and very important operation in nature, various noxious or deleterious gases are produced, which at one time causes the fever and ague, at another the yellow fever, and at another, perhaps, the cholera.

The lovers of good bread (and who does not love it?) will probably not thank us for serving up for them a batch of cholera and yellow fever, instead of some fine light rolls, some penny loaves, or even the Boston brown, or the Kentucky corn bread, which undoubtedly does its part towards raising a noble race of men, and which, at any rate, we should admire to see upon our table, as often as once a day.

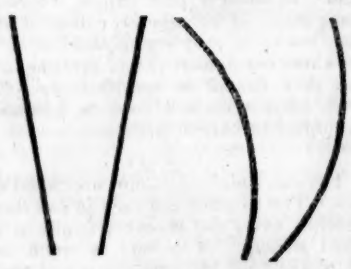
But more of these hereafter.

GEOMETRY.

LINES.



Parrallel Lines.



Oblique Lines.

The elaborate courses of reasoning which many have entered into, to prove that parrallel lines are equally distant, has appeared to us like an attempt to prove that water is wet. The first impression, the common acceptation, and it seems to us, the correct view of parallelism, is equidistance. And it can hardly need a labored and complicated demonstration to prove, that while lines continue equally distant, they cannot meet. It does not require a profound knowledge of mathematics to see, and to know, that while two lines continue a foot or an inch apart, they cannot come together. We shall therefore not take up time and paper to prove, that when two lines are so situated, as never to meet if continued, they are equally distant; nor, that while they continue equally distant, they cannot meet; but will, without the formality of definitions, or the maize of demonstration, and by those means obscure light and perplex simplicity, refer our readers directly to a few of the cases and uses of *parallel lines*.

The farmer, in plowing his field, aims at throwing the furrows, as nearly as possible, into parallel lines. His fences, the trees in his orchard, his rows of corn, potatoes, beets, carrots, &c. he endeavors to put in parallel lines. The carpenter, in erecting his buildings, whether it is hewing the timber, placing the posts, cills or joists, or in forming the doors, windows, floors, walls, or any other part, has constant regard to parallel lines.

The surveyor, in running his courses and in plotting his field, can hardly move a step, without a rigid regard to parrallel lines.—The whole valley of the Mississippi has been, or is to be divided by parallel lines, six miles apart, running exactly north and south, which are cut at right angles by parallel lines at the same distance, running east and west. These parallel lines will thus divide that great valley of our country and our globe into something like twenty thousand townships, each exactly six miles square, or containing thirty-six square miles. Thus:

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each of these townships is again divided by parallel lines one mile apart, making thirty-six sections, one of which, the sixteenth, is appropriated to the support or promotion of schools. These sections are again divided by the same kind of lines in quarter and half quarter sections.

The first object of machines for ruling paper is to make the lines parallel. In writing letters to our friends, we endeavor to make the lines parallel, but not always with complete success.

The weaver, in putting his yarn into the loom, and in uniting the filling with the warp, uses his best endeavors at forming a continued series of parallel lines, and in numbers which would trouble him, perhaps, to calculate. And even the tailor, the mantuamaker and the milliner, cannot follow the meandering courses, necessary to keep pace with their three months or six weeks changes of fashion, without observing some lines which are straight and parallel.

The diagrams above will give an illustration of several relations of lines to each other, which by the way are expected or designed to do little more, with the glance here made at the subject, than to invite minds who wish for their own improvement to examine, compare, judge, make applications and draw conclusions for themselves. *Self-Education* is our motto.

Lives of the Indians...No. I.

WRITTEN FOR THE YOUTH OF AMERICA.

Since first the Indian saw the white man's flame,
And cried, 'Oh welcome!' as the stranger came,
How blest the change this happy land has viewed,
To glad her shores, and cheer her solitude.

Samoset.

When our ancestors, the white people, first came from England to this country, they found the places, where we now live, occupied by a people different from themselves. They were of a reddish color, with long black hair, and had little clothing except the skin of a bear, or some other animal, tied around them. The white people had seen many of these red men, but they were very shy, and would only show themselves afar off. But one day, about three months after the arrival of the settlers at Plymouth, a noble looking Indian came into the town, and, walking by the houses, came boldly up to the place where some of the white people were collected, and cried out, 'Welcome Englishmen! welcome Englishmen!' The white people were surprized to hear him speak English, because the Indians had a language of their own, the words of which were different from ours. He told them that his name was Samoset, and that he was a sagamore, or king, of some Indians who lived a great way off, to the eastward, as far as a boat could sail in a day; and that he had seen some English fishermen, and learned some of their words. He had no other clothes, but a great piece of leather round him, ornamented with a fringe. He was a tall, straight man, with very black hair, long behind, and short before, and without any beard. The weather was cold, because it was winter; so the white people gave him a great coat, to keep him warm. At night he lodged in the house of Mr. Stephen Hopkins; but the white people watched him, because they were afraid he would steal something, or perhaps kill some of them. But he appears to have been a very friendly Indian, and it was hardly generous for the white people to suspect him, when he came to them so honestly, and bade them welcome to his country. For the Indians were once the owners of all this pleasant land, where we now live. They had two kinds of kings, called sagamores and sachems; one was king of a few Indians in one place, and the other of many Indians in many places. When the red men first saw a ship, they thought it was an island with wings; and when they saw the guns discharged, they supposed that the white people had the power to make it thunder and lighten. The Indians generally treated the white people well, until they were offended by injuries; and Samoset desired to be remembered, as being the first Indian who spoke to the people at Plymouth, and the first who bade them 'welcome!' The next morning, Samoset went to a tribe of Indians near, and brought back some tools which had been taken away, and with him came five other Indians, with some beaver skins. He afterward brought an Indian called Squarto, who had been stolen away and carried to London. He also brought word that Massasoit, the great sachem, was coming to see them. We do not hear any more of Samoset, but it is probable that he returned to his people, and told them all about his visit to the white men, and what he had seen among them. In my next number, I will tell you about Massasoit, the great sachem, who came to see the whites, with some anecdotes, which I think will be interesting to you.

L.

Gravitation.

What causes apples to fall from their trees to the ground? Gravitation. What renders it harder to ascend, than descend a hill? Gravitation. What causes water to run from the mountain into the ocean, rather than from the ocean on to the mountain? Gravitation. What gives weight to bodies? Gravitation. What causes rain, hail and snow to descend to the earth? Gravitation. What gives water power to move the main wheel of a manufactory, and with it thousands of spindles, spools, shuttles, looms, &c.? Gravitation. What causes water to rise in a pump? Gravitation. What causes tides to ebb and flow? Gravitation. What causes the moon to revolve round the earth? Gravitation.

What causes the earth and other planets, with their moons, and the asteroids and comets, to move round the sun? Gravitation. What preserves order, regularity and harmony among all the bodies of our solar system, and between that and the millions of other systems surrounding other suns, scattered through space? Gravitation.

Moral Science.

The law of love is to a moral universe what the law of gravitation is to a material creation. Each must be as extensive as the kingdom it governs. Gravitation governs not only systems, but atoms of matter. Love to God and our neighbor must govern not only nations and individuals, but every thought, motive, design, feeling and emotion of every individual.

The law of gravitation cannot be violated without disturbance in matter. The law of love cannot be violated, without still greater disturbance, and absolute suffering among moral beings.

The whole material universe, every system, sun, planet, and the minutest atom of matter, all that can be brought within the view of the telescope or the microscope, yields implicit and constant obedience to the law of gravitation. There are hence, order, regularity, harmony, beauty and grandeur among systems and atoms of matter.

In the moral creation there is almost a universal and constant violation of the law of love—of doing as we would be done by—of doing good to our neighbor, making our neighbor the whole intelligent and animate universe. For the law of love or benevolence, is substituted the law of selfishness; and selfishness begets ambition, envy, hatred, revenge; and they produce disturbance, commotions, contentions, war, disease, ruin and death.

When the fundamental law of all moral science, and the only law, which can regulate a moral creation, receives the same implicit and constant obedience, which matter renders to its laws, the order, regularity, beauty, harmony and sublimity in the moral universe, will infinitely surpass any and all the operations, which ever were or ever can be carried on, among atoms, worlds, planets suns or systems of matter. Then will be the millennium.

Uses of Geology.

This science is useful to farmers, as it acquaints them with the nature and value of their soils, and the best means of improving them. It is useful to mechanics, as it brings forth the hidden treasures of the earth, and furnishes the materials used in the arts. It is useful to children, as it furnishes them with a delightful amusement and much useful exercise, while it enriches their minds, and learns them to be observing in all objects around them. It is useful to the christian, as it teaches more than any other science except astronomy, the power, the wisdom and the goodness of Him, who weighed the mountains in a scale and the hills in a balance. It is useful to a nation, as it opens its resources and teaches the best method of applying them for the advancement of its wealth and general prosperity. It is useful to science, as it is constantly enriching its treasures with new discoveries and new acquisitions. It is useful to morals, as it leads the minds of young people to the works of their Creator, and diverts them from subjects calculated to dissipate and degrade them.

Family Apparatus.

No mother needs to be informed, that children have active bodies, sprightly minds, and susceptible hearts—that they commence acting and learning with their existence—that they accumulate ideas with immense rapidity—that they learn the names, properties, and uses, of very numerous objects around them during the first year of their lives—that during their second year, they are eager in the pursuit of objects to occupy their minds, and exercise their limbs—or that their character at the age of three or four, depends almost entirely on the objects, examples, and associations which surround them.

The great question is, what is the best selection of objects to bring in contact with children, on which they may exert and spend their strength of body, mind and feeling? Employed, they must and will be—they ought to be; the question is, how? Every one will say, of course, that those associations and that employment are best for children, which are best calculated to give them a healthy body, a vigorous mind, and a pious heart.

It is under those views, that the family apparatus, or intellectual toys for children, have been selected. A portion of the articles will attract the attention, and interest the feelings of children of from twelve to eighteen months old, and from that to three years old. Other parts of the apparatus will furnish much pleasing and useful employment, to children from four to six or eight years of age. When children of different ages are together, they amuse and instruct each other; especially may the older become efficient and profitable teachers to the younger.

Some of the advantages of the family apparatus are the following:

1. It affords employment to children. This they must have of some kind. The employment they choose for themselves is sometimes inconvenient to the parent, and perhaps hurtful or dangerous to the child. They are ready to try experiments upon crockery, with edged or pointed tools, or such other instruments as they find to perform their work. By this apparatus, their tools and their work are furnished at their hands.

2. It makes children happy. It makes them happy by keeping them employed. By giving a voluntary and an agreeable exercise to their muscles, their intellects, and their dispositions.

3. It affords much useful instruction to children. It presents to them the elements of those sciences and that knowledge, which they will find useful and necessary in after life. It gives them, in the first instance, the proper names of things, and makes their first impressions correct, and of course avoids the necessity of their afterwards unlearning, or correcting mistakes.

4. It prevents contentions and the clashing of interests among children. They can unite in their amusements, and employ and instruct each other, and thus cultivate kind feelings instead of irritating and souring their tempers.

5. It relieves mothers. The want of something to employ, amuse, and instruct children, makes a constant demand upon the time, the patience, and the various resources of mothers, and too often finds them unable to satisfy their demands. The variety and the character of these intellectual toys, at one time enable parents to amuse and instruct their children; at another, they are relieved by the amusement and instruction they render to each other, or to a child by itself.

6. It saves expense. What is called the mischief of children, is sometimes very expensive as well as troublesome. This mischief is their employment, which they select for themselves, because their parents select none for them. They can use these intellectual tools designed for them without injuring them. They also avoid the necessity of the common children's toys found in shops, which are soon destroyed, and are therefore expensive, and too often immoral in their tendency.

7. It will prevent the growth of vice and bad passions in children, and have a tendency to reform society. A great portion of the vice and corruption of society evidently arises from amusements of a bad tendency. If those could be corrected, society must be greatly improved. If they are corrected in early childhood, a change of those to other young people, and to persons of all ages, must soon follow.

Our Paper.

It gives us pleasure to inform our friends, and to acknowledge to our patrons, that the prospects for the Family Lyceum far exceed our anticipations. A large list of subscribers is already collected and almost entirely by names sent in, voluntarily, many from a distance. There now seems to be a certainty, that a Family Scientific Paper may have a large and extensive circulation; and we believe that the time is near, when every intelligent family will consider such a paper from some source, entirely indispensable, as well as entertaining and useful.

We should do injustice to our own feelings, as well as to the conductors of numerous journals of the first respectability in almost every part of the country, if we did not acknowledge the distinguished kindness they have manifested in noticing our humble attempt to cooperate with them in diffusing intelligence through our Republic. It will be our first endeavor to render our future efforts worthy of their cooperation, and of the public confidence, by devoting them exclusively to the diffusion of useful knowledge.

To those who may object to the price of our sheet, as it is a little higher than some other sheets of an equal size, we wish to say, that our only motive in fixing upon the terms, was to secure the means of rendering it *a good paper*, and in the highest degree to remunerate the subscribers for their expense. It would be respectful, neither to ourselves nor our patrons, to be satisfied with merely sending them a *cheap paper*.—And when it is understood, that nothing is to be received for advertisements, that a considerable expense must occur for cuts, that a large portion of the matter must be original, and that the selections must be made with much care and labor, and from an expensive library, it will be readily seen, that a paper of the character proposed by the Lyceum, must be attended with much greater expense than an ordinary newspaper: and that considering the expense, the price is not higher than that of other sheets of the same size and amount of matter. It is our hope and our confidence, as it will continue to be our constant endeavor, to make the Lyceum worth the price it costs, to all who peruse its columns, and afford it their patronage.

All communications and remittances in behalf of the Lyceum, may be made to the editor.

School Lands.

How can the school section in each of the twenty thousand townships divided, or to be divided, in the valley of the Mississippi, be appropriated and applied, so as most completely to answer their design? is a question, perhaps, of as much importance, and as intimately connected with the future prosperity of our nation, as any which can be proposed. The situation of the 16th section which in each township is to be devoted to education, can be seen by a glance at the diagram of squares, under the head of Geometry, on the opposite page.

Some inquiries, and perhaps suggestions, on this great and interesting question, may probably be made in future numbers of the Lyceum.

Town Maps.

Any one who doubts the great importance of having the geography, geology, topography, and something of the agriculture and statistics of every county and town in the Union, delineated on a map, or the great ease with which it may be effected, is invited to examine some of the Lithographic town maps executed by Mr. Pendleton, of Boston. Such an examination will not only remove all doubts, but will probably lead most who make it, to take the first and second steps in performing their part in this great object of National Wealth, and personal convenience. The object was recommended by the American Lyceum, at their first and second meetings, and much progress has already been made in it.

Lyceum Seminaries.

Institutions for *self-instruction*, *self-education* and *self-support*, have ever been considered as the foundation on which the Lyceum system must eventually stand. The time has come when such an institution can be sustained in nearly every county in the Union. Definite steps will be proposed and *taken* in relation to this subject in a few weeks. The organization of County Lyceums would greatly aid the undertaking.

Teachers' Seminary, Andover.

We have received an interesting communication containing the plan, operations, and results of the excellent institution under the charge of Mr. Hall, author of Lectures on School Keeping. It will give us pleasure to present it to the public in our next number.

Parents and Teachers.

The cooperation of parents with teachers, in the education of their children, has long been considered as the great desideratum, to crown school instruction with complete success. As this cooperation is a prominent object of the Family Lyceum, it is gratifying to hear many of our most skilful teachers express their opinion that a paper of the kind here proposed is well calculated to effect the object. It is already introduced into several schools, for reading exercises, and for study as a book of science. Many other teachers and school committees are making arrangements to introduce it, and there is a fair prospect that this, or some other weekly paper, will soon be used in every school in our land. By such an arrangement, it will answer the double purpose of a family paper and a school book.

Apparatus.

Arrangements are made by which every lyceum, school and family in our land can be furnished with a set of apparatus, designed for intellectual, social and moral improvement, and to enable these three most interesting and numerous classes of institutions to cooperate with each other in the great work of *Universal Education*. The price of a set for a lyceum is about $75; a set for a school $10; and those for families, from $5 to $10.

Economy, or the mere saving of money, no less than intellectual improvement and moral dignity, would lead every member of our Republic to render the mite of effort and money necessary to take this first step towards furnishing more, better and cheaper instruction and entertainment to every person who has a mind to understand, or a heart to feel the pleasure or the use of knowledge.

Lynn Schools.

We doubt if there are any better schools in New England, than the public schools of Lynn. The distinguished intelligence and skill of their teachers, and the generous liberality of the citizens, render these schools worthy of being visited and imitated by all teachers and all parents who wish to have children well taught. A visit to them, a few days since, afforded us both entertainment and instruction.

To Strangers.

The Columbian Hall, back of the Court House from School Street, with a library, a small collection in Natural History, apparatus, &c., is at the service of any strangers or citizens who may be disposed to visit it, or to conduct any exercises for their intellectual and social entertainment and instruction, during the present and coming weeks.

Comparative Meteorology.

It would give us great pleasure to afford even a slight aid in carrying into effect, the request made by our correspondent on the weather. If the results of meteorological tables kept in different parts of the country should be sent us, we would undertake to present them to the public, and in such a form that a comparative view of the weather in different places on the same day could be seen. As such a table can be kept with little trouble by some individuals, especially by Lyceums, in every place, we hope to be favored with some in the course of the present season.

Lectures on Health.

A course of Lectures on the elementary substances, principles and operations of nature, as connected with health and disease, with a moral and religious application, will commence in a few days in Boston. Ladies and gentlemen interested in the subject, are invited to meet at the Columbian Hall on Monday evening next, when some experiments and illustrations explanatory of the course will be given.

Economy.

A farmer, who had several boxes of dollars secured by strong nails, and safely buried in his cellar, sharpened his plow share upon a grind stone, because he could not afford to pay the blacksmith's bill.

A subscriber to a newspaper, not being able to pay twenty-five cents a year to the post rider for delivering his paper, travelled, or sent ten miles every week after it, which at a moderate calculation cost him ten dollars.

A parent being unable to secure the improvement of his child at school by one dollar for books, was at the expense of one hundred dollars at least for clothes, tuition, and still more for his time and future character, and usefulness for—*nothing*.

Cholera Manufactories.

The cholera is still manufactured at a few distilleries in nearly all the states. Several are manufacturing large quantities of it every week in New England; and one or two are said to be carrying on the business largely in the good city of Boston.

School Statistics.

About one third of the whole population of a country are between the ages of three and sixteen or eighteen; and of course are the proper subjects of school education.

In the United States, more than four millions of children ought to be under the influence of schools.

In Maine, the law requires that the inhabitants of every town pay annually for the support of schools, a sum equal, at least, to 40 cents for every person living in it. That amounts to about $120,000. Their expenditures are more than $140,000.

In New Hampshire, a separate tax of $90,000 is raised for schools, besides an annual appropriation from a tax on Bank Stock of 9 or $10,000.

In Vermont, more than $50,000 are raised for schools, from a three per cent tax on the grand list, and as much more from district taxes, besides an income of nearly $2,000 from banks.

In Massachusetts, are nearly three thousand schools, supported by public taxes and private subscriptions. In Boston, the schools contain more than 12,000 children, at an expense of about $200,000.

In Rhode Island, are about 700 schools, supported by a legislative appropriation of $10,000 annually, by taxes and by private subscriptions.

The Connecticut School Fund is nearly two millions, but fails of its desired object. Children in the state, 85,000, schools about 1,500.

In N. York, are more than 9,000 schools, and over 500,000 children taught in them. School fund, $1,700,000; distributed annually, $100,000, but on the condition that each town raise by tax, or otherwise, as much as they receive from the fund. A wise provision.

New-Jersey has a fund of $245,000, and an annual income of $22,000.

In Pennsylvania, during the last year, more than 250,000 children, out of 400,000, were destitute of school instruction.

Delaware has a school fund of $70,000.

Maryland has a school fund of $75,000, and an income for schools from the banks, which are divided between the several counties.

Virginia has a fund of $1,233,000, the income divided among the counties according to the white population, and appropriated to paying the tuition of poor children, generally attending private schools.

North Carolina has a fund of $70,000, designed for common schools.

South Carolina appropriates $40,000 annually to free schools.

Georgia has a fund of $500,000, and more than 700 common schools.

Alabama, and most or all the western and southwestern states, are divided into townships, six miles square, and each township into sections one mile square, with one section, the sixteenth, appropriated to education.

Mississippi has a fund of $28,000, but it is not available until it amounts to $500,000.

The Legislature of Louisiana grants to each parish, or county, in that state, $2,62 1-2 for each voter, the amount for any one parish not to exceed $1,350, nor to fall short of $800. $40,000 are applied to educating the poor.

Tennessee, has a school fund of about half a million, but complaints are made that it is not well applied.

Kentucky, had a fund of $140,000, but a portion of it has been lost. A report to the Legislature, from Rev. B. O. Peers, says, that not more than one third of the children between the ages of four and fifteen, attend school.

In Ohio, a system of free schools, similar to that of New England, is established by law.

In Indiana, Illinois, and Missouri, no legislative measures for the support of schools have been adopted. All the schools are supported by private tuition.

EXPERIMENTS.

CHEMISTRY.

Housekeepers often pour vinegar, or sour cider, upon pearlash or saleratus, which prodnces a brisk effervescence. The bubbles of air thrown off, are carbonic acid. When these ingredients are mixed in a pint or quart pitcher or glass, and the effervescence continued for a few minutes, and a burning candle or a small paper be inserted, it will be immediately extinguished, showing that carbonic acid is fatal to combustion. It is equally fatal to life.

In November last, a passenger in a steamboat passing down the Mississippi, drew his silk handkerchief over the brass top of an andiron, and placed a hot coal of fire upon it, without injury to the handkerchief.

Another passenger put a few spoonfuls of honey into a box, made of common writing paper, and placed it upon hot coals on the hearth, where it remained until the honey boiled without scorching the paper.

INTELLECTS.

Fifteen or twenty years ago, a mechanic of rather a heavy, phlegmatic temperament, procured a patent right for an invention in machinery. By this means he was placed beyond the necessity of laboring as he had done, for the support of a large family, and was enabled to indulge his disposition for sloth and inaction. He hence made little effort either of body or mind, but spent his time in moderately walking, and sitting in the house. His disposition for inactivity increased with the indulgence of it, until he hardly moved from his chair in the course of a day. Under this indulgence his mind gradually lost its elasticity and strength, until it was reduced, in the course of a few years, to perfect idiocy He died three or four years since as helpless as an infant, and almost as senseless as a stone.

Since the practice of solitary confinement in state prisons, which deprives the convicts of social intercourse, and in a great measure of mental effort, it has been found that many intellects, which when they entered the prison, were uncommonly active and vigorous, have become greatly impaired, and while they become in a measure harmless beings, they are also in their minds brought nearer those animals which know not how to do wrong.

About ten years since, a man of nearly sixty years old, who was somewhat distinguished for his talents, was removed to a situation where he had great and constant demands upon his efforts and his resources. Since that time, his mind has been kept constantly upon the stretch, and with his increased efforts, not only his resources, but his vigor of mind, and even his health and youth have been renewed and strengthened.

MORALS.

Within a few weeks past, a gentleman in a neighboring town, has been in the habit of frequently walking into the garden with a little daugter of about five years old, and conversing with her upon the productions of her Creator. Among other things they found one morning after a rain, some small ants very busily and actively employed in carrying dirt from their holes. After witnessing their operations and conversing about them, the daughter observed to her father, that she thought the little animals were hungry, and got permission to bring them some crumbs of bread, which they took with aparent eagerness and carried into their holes. She continued to feed them daily, and her kindness to them, produced affection for them, which was soon extended to some young doves, which she now feeds with great care and kindness. She has many times cried bitterly from her father's leaving home without giving her an opportunity to kiss him.

A few weeks ago, a mother went to her door, in Boston, and saw three or four of her children, who were much more amiable than could have been supposed, playing in the yard, and making some noise. With a harsh voice, and snarling tone, she cried out to her children, 'Come in this minute, or I will wring your necks, every one of them.' The children, as the reader will suppose, neither went in nor got their necks wrung.

The Weather.

Mr. Editor—I have often wished that some periodical would give to the public a journal of the weather, in such a way that the state of the atmosphere in different places on the same day might be compared. So, for example, that it might be seen, what the temperature, the winds and the general state of the atmosphere were, on the first day of each month, in Boston, Philadelphia, Charlestown, New Orleans, St. Louis, Quebec, and if practicable, in London, Paris Canton, &c. I have hoped that Lyceums throughout the country, might keep meteorological tables, and once a month have a schedule of them presented in some public journal, so that a comparative view of them might be seen.

Such a system of *comparative meteorology* could hardly fail of being interesting to numerous readers, and it might furnish some facts in aid of the theory of winds and the weather.

As I understand, your journal is to be devoted to science and useful knowledge, I hope you will be able and disposed occasionally to devote a column to statements, if not to the science, of the weather.

From the Watchman.

Intellectual Toys.

None of the numerous efforts to enlighten, Christianize and redeem the world, promise, perhaps, such speedy, certain and glorious results, as those in behalf of the early education of children. Infant Schools, and especially Infant Sabbath Schools, form a new era in the history of the world. Courts of justice, and prisons, might throw out and execute their threatnings for a hundred centuries to come, without *beginning* to reform society. But let the early education of children be correct all over the earth, and in thirty years, the millenium must have more than commenced, it must actually have arrived.

And education never can be correct until Infant Schools, both on the Sabbath and during the week, do their perfect work, until the toys, the sports, and the amusements of children be changed, until children, during the two or three first years of their lives, are furnished with instruments better calculated to strengthen their bodies, interest their minds, and improve their hearts.—The formal and didactic instruction of the school, will in a great measure be powerless, while the almost constant social intercourse of children with each other, with their parents, and the various classes with whom they associate, is immoral in its tendency.

Such being the case, it is truly encouraging, and even animating, to witness the impulse now going abroad in our land on the subject of children's toys. The opinion already prevails to a great extent, and is every day becoming more common, that a set of family apparatus, or intellectual toys for children, is an essential and the most important part of the furniture of the nursery.

The time is certainly near, when throughout our own country, and it is hoped throughout the world, children, almost from their existence, will be furnished with instruments, calculated at once to cultivate strength of body, largeness and vigour of intellect, and kindness if not piety of heart.

The conclusion that such will be the common sentiment, and such the common intellectual furniture of our houses, is fairly drawn from the eagerness with which the proper toys for children are sought, and the promptness with which they are procured, whenever they are furnished, by a large portion of families. It is not at all uncommon now, in our social family visits, to witness several small children, busily and happily employed with their intellectual toys. It is truly delightful to see the happiness which they enable children to communicate to each other, instead of being the cause of contention and ill will. It is highly gratifying to witness the pleasure, and I may add the instruction, experienced by mothers, in watching the ingenuity, the sprightliness, and the social and kind feelings, these toys produce in children, not to speak of their relief from the teazing, the uneasiness, and the consequent contentions to which children are often subject, and in nine cases out of ten, from the want of proper instruments to employ them.

I cannot but look upon the universal introduction of appropriate toys for children, into all the families throughout our country, as an object of great importance to education, to religion, and to the reformation of the world.

From Good's Gallery of Nature and Art.

Volcanoes, Earthquakes and Subterranean Fires.

That fires to an enormous extent, and produced by various causes, may exist at different depths beneath the surface of the earth, must, we think, be clear to every one who has attentively perused the preceding chapters of the present book; and we have much reason to believe, from a very curious series of experiments lately conducted by Sir James Hall, that, where the substances in which such fires occur lie profound, and are surmounted by a very deep and heavy super-incumbent pressure; and, more especially, where they, at the same time, contain large portions of elastic gases; the effects of such fires will be prodigiously greater, and more diversified, than where these circumstances are absent.

Earthquakes and volcanoes may be reckoned, for the most part, among the most powerful and extraordinary of these effects, and as resulting from those chemical changes which the agency of fire principally produces in the interior of the solid crust of the globe. They have, probably, little further connection with electricity than as causes that occasionally destroy the equilibrium; for although some authors have inferred, from the great velocity with which the shock of an earthquake is transmitted from place to place, that its nature must be electrical, yet others have, with greater probability, attributed the rapid succession of the effects to the operation of a single cause, acting like subterranean heat, at a great distance below the earth's surface. There are, however, some circumstances which indicate such a connection between the state of the atmosphere and the approach of an earthquake, as cannot easily be explained by any hypothesis.

The shocks of earthquakes, and the eruptions of volcanoes, are in all probability modifications of the effects of one common cause; the same countries are liable to both of them; and where the agitation produced by an earthquake extends further than there is any reason to suspect a subterraneous commotion, it is probably propagated through the earth nearly in the same manner as a noise is conveyed through the air. Volcanoes are found in almost all parts of the world, but most commonly in the neighborhood of the sea; and especially in small islands; for instance, in Italy, Sicily, Iceland, Japan, the Carribbees, the Cape Verd islands, the Canaries and the Azores; there are also numerous volcanoes in Mexico and Peru, especially Pichincha and Cotopaxi. The subterraneous fires, which are continually kept up in an open volcano, depend perhaps in general on sulphureous combinations and decompositions, like the heating of a heap of wet pyrites, or the union of sulphur and iron filings; but in other cases they may perhaps approach more nearly to the nature of common fires. A mountain of coal has been burning in Siberia for almost a century, and must probably have undermined in some degree the neighboring country. The immediate cause of an eruption appears to be very frequently an admission of water from the sea, or from subterraneous reservoirs; it has often happened that boiling water has been discharged in great quantities from a volcano; and the force of steam is perhaps more adequate to the production of violent explosions, than any other power in nature. The consequence of such an admission of water into an immense collection of ignited materials, may in some measure be understood, from the accidents which occasionally happen in founderies; thus a whole furnace of melted iron was a few years ago dissipated into the air in Colebrook Dale, by the effect of a flood which suddenly overflowed it.

The phænomena of earthquakes and volcanoes are amply illustrated by the particular accounts, transmitted to the Royal Society by Sir William Hamilton, of those which have happened at different times in Italy. The earthq ake, which desolated Calabria in 1783, was fatal to about 40,000 persons, continuing its ravages for more than three months; it destroyed the towns and villages occupying a circle of nearly 50 miles in diameter, lying between 38 and 39 degrees latitude, and extending almost from the western to the eastern coast of the southernmost point of Italy, besides doing considerable damage to places at much greater distances from its origin, which is supposed to have been either immediately under the town of Oppido, in the centre of this circle; or under some part of the sea, between the west of Italy, and the volcanic island of Stromboli. This island, as well as Mount Etna, had smoked less than usual before the earthquake, but they both exhibited appearances of an eruption during its continuance; Etna towards the beginning, and Stromboli at the end. Before each shock the clouds were usually motionless for a certain time, and it rained violently; frequently also lightning and sudden gusts of wind accompanied the rain. The principal shocks appeared to consist in a sudden elevation of the ground to a considerable height, which was propagated somewhat like a wave, from west to east: besides this, the ground had also a horizontal motion backwards and forwards, and in some measure in a circular direction. This motion was accompanied by a loud noise; it continued in one instance for ten seconds without intermission; and it shook the trees so violently that their heads nearly reached the ground. It affected the plains more strongly than the hills. In some places luminous exhalations, which Sir William Hamilton thinks rather electrical than igneous, were emitted by the earth; the sea boiled up near Messina, and was agitated as if by a copious discharge of vapors from its bottom; and in several places water, mixed with sand, was thrown up to a considerable height. The most general effect of these violent commotions was the destruction of buildings of all kinds except the light barracks of wood or of reeds, into which the inhabitants retreated as soon as they were aware of their danger; the beds of rivers were often left dry, while the shock lasted, and the water on its return overflowed their banks; springs were sometimes dried up, and new ones broke out in other places. The hills which formed the sides of steep valleys were often divided by deep chasms parrallel to the valleys; and in many cases large portions of them were separated, and removed by the temporary deluge to places half a mile or a mile off; with the buildings and trees still upon on them; and in this manner hills were levelled and valleys were filled up. But the most fatal accident of this kind happened at Scilla, where so large a portion of a cliff was thrown into the sea, that it raised an immense wave, which carried off more than 2000 inhabitants who were collected on the beach, and even extended its formidable effects to the opposite coast of Sicily, where several persons perished by it in a similar manner.

The eruptions of volcanoes are usually attended by some shocks like those of earthquakes, although commonly less violent. Open volcanoes continually throw out in more or less abundance, smoke, ashes, and pumice stones, or light cinders; but their most formidable effects are produced by a torrent of ignited lava, which like a vast deluge of liquid or semiliquid fire, lays waste the country over which it runs, and buries all the works of human art. In March, 1767, Vesuvius began to throw out a considerable quantity of ashes and stones, which raised its summit in the course of the year no less than 200 feet, forming first a little mountain of pumice stones within the crater, which by degrees became visible above its margin. The smoke, which was continually emitted, was rendered luminous at night, by the light derived from the fire burning below it. In August some lava had broken through this mountain, and in September it had filled the space left between it and the former crater. On the 13th and 14th of October there were heavy rains, which perhaps supplied the water concerned in the eruption that shortly followed. On the morning of the 19th, clouds of smoke were forced, in continual succession, out of the mouth of the volcano, forming a mass like a large pine tree, which was lengthened into an arch, and extended to the island of Caprea, 28 miles off; it was accompanied by much lightning, and by an appearance of meteors like shooting stars. A mouth then opened below the crater, and discharged a stream of lava, which Sir William Hamilton ventured to approach within a short distance, imagining that the violence of the confined materials must have been exhausted; but on a sudden the mountain opened with a great noise at a much lower point, about a quarter of a mile from the place where he stood, and threw out a torrent of lava, which advanced straight towards him, while he was involved in a shower of small pumice stones and ashes, and in a cloud of smoke. The force of the explosions was so great, that doors and windows were thrown open by them at the distance of several miles; the stream of lava was in some place two miles broad, and 60 or 70 feet deep; it extended about six miles from the summit of the mountain, and remained hot for several weeks. In 1794 a still more violent eruption occurred; it was expected by the inhabitants of the neighborhood the crater bring nearly filled, and the water in the wells having subsided. Showers of immense stones were projected to a great height; and ashes were thrown out so copiously that they were very thick at Taranto, 250 miles off; some of them also were wet with salt water. A heavy noxious vapor, supposed to be carbonic acid, issued in many places from the earth, and destroyed the vineyards in which it was suffered to remain stagnant. A part of the town of Torre del Greco was overwhelmed by a stream of lava, which ran through it into the sea; yet notwithstanding the frequency of such accidents, the inhabitants had so strong a predilection for their native spot, that they refused the offer of a safer situation for rebuilding their houses.

QUESTIONS

ON THE FIRST NUMBER OF THE LYCEUM.

Is anything in the material world, more common than air?

What other liquid can be mixed with cold water to render it intensely hot?

Why is iron made hot by hammering?

What becomes of the water which runs into the ocean, by the numerous rivers upon the earth?

What are some of the other uses of evaporation, besides furnishing materials for clouds and rain?

What are the two principal ingredients in the atmosphere, and which the most interesting?

Of what liquid and solid substances, does oxygen constitute a part?

Which is mixed with oxygen to form water, nitrogen or hydrogen? and which of the two is mixed with oxygen in the atmosphere?

What other substance unites with oxygen and hydrogen, to form the whole of the vegetable kingdom?

What fourth substance is added to the three which constitute vegetables, to form animal substances?

Is it Carbon or hydrogen which produces the blaze in a wood or coal fire, also in the candle and lamp?

Which contains the most hydrogen, anthracite, or bituminous coals?

What is the difference between a perpendicular, and a vertical line?

Which ought first to be put into the hands of children, books, or slates and pencils?

Is silex, alumine, lime, or magnesia, the most common and abundant earth in soils and rocks?

Do sandbanks consist of silex, or alumine? and where is alumine most abundant, in sand, or clay?

Are the ten earths simple, or compound substances?

Is the first operation of the mechanic, cutting to pieces, or putting together, the materials he uses?

What are some of the tools used by mechanics?

Are tanning, and making varnish and soap, chemical, or mechanical operations?

Are making shoes, chairs, and beaureaus, chemical, or mechanical operations?

What is the origin of water power? also of steam and wind?

What is the origin of animal strength?

How many kinds of printing are in common use, and what the distinction between them?